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The National Geographic Magazine

AN ILLUSTRATED MONTHLY

Editor: JOHN HYDE

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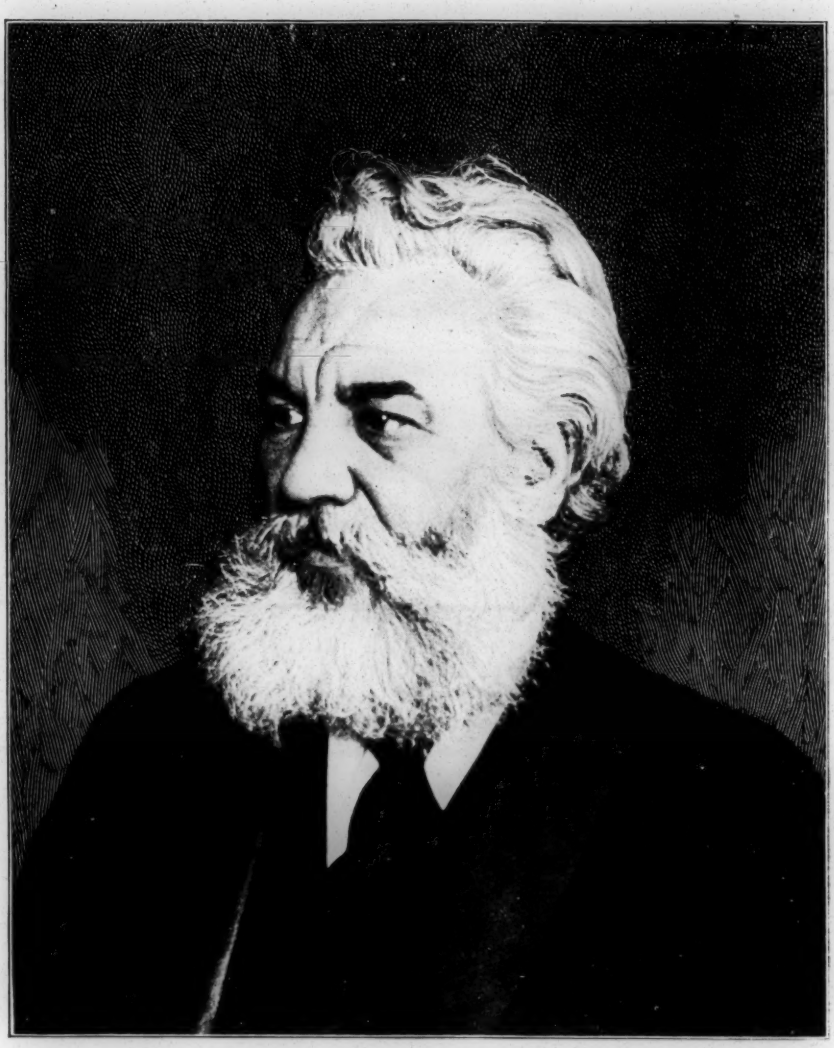

Alexander Graham Bell

Photo. by Frank M. Bateler, Wash'n. *Eng. by Gatchel & Manning, Phila.*

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DWELLINGS OF THE SAGA-TIME IN ICELAND, GREENLAND, AND VINELAND

By CORNELIA HORSFORD

The Saga-time began with the colonization of Iceland in 875 and lasted for about 150 years. During this time the oft-repeated accounts of the discovery, colonization, and early history of Iceland, as well as that of all Scandinavia, acquired the form of Sagas or narrations. Ari Thorgilsson, the historian, who was born in Iceland in 1067 and died in 1148, was the first to write down these events in chronological order. In each of the four books attributed to this writer Greenland and Vineland are briefly mentioned.* Other Sagas relate the adventures, tragedies, and family histories of the colonists, and among these are the Sagas which tell about Greenland and Vineland.†

We know that Scandinavia has been a rich field for collecting relics of the stone, bronze, and early iron ages, but no ruin of a dwelling dating from the Saga-time has yet been identified in Denmark, Sweden, or Norway. This may be due to the lack of durability in the way of building the houses and to the custom of using over and over again in new buildings all the suitable material from the old walls.

In 1888 a young Icelander named Valtýr Gudmundsson, who was studying for the degree of Doctor of Philosophy at the Uni-

* Islendingabók, Landnamabók, Kristni-Saga, and Konungabók.

† Hauksbók, Eiríks Saga Rauthi, and Flateyjarbók. Greenland and Vineland are also briefly mentioned in the Fornmanna Sögur, Eyrbyggja Saga, and in three vellum manuscripts in the Arna-Magnæan Library at Copenhagen. An account of these will be found in the first chapter of "The Finding of Wineland the Good," by Arthur Middleton Reeves. London, 1890, Henry Frowde.

versity of Copenhagen, chose for the subject of his thesis "Private Dwellings in Iceland in the Saga-time."* In preparing for this he read every saga of his native literature, comparing each description, sentence, and word relating to his subject, until in imagination he had reconstructed every form of dwelling and outhouse of the Saga-days. These buildings differed considerably from the design given by Finsen in his edition of Gunnlaug's Saga, printed in 1775, which was the accepted model until the publication of Dr Gudmundsson's work.

In 1894 Lieutenant Daniel Brunn, of the Danish navy, was sent by the Danish government to make extended researches among the Norse ruins in Greenland. These researches went far toward confirming the results of Dr Gudmundsson's studies.

It was therefore with much gratification that Dr Gudmundsson (who was by that time professor of Old Norse literature and history at the University of Copenhagen) accepted my commission to direct archeological researches for me among the ruined dwellings and other works of man in Iceland during the summer season of 1895.† He took with him from Copenhagen another Icelander named Thorsteinn Erlingsson, and to him the greater part of the work is to be accredited, for Dr Gudmundsson was in attendance at the Icelandic Parliament and could not be present in the field himself.

ICELAND

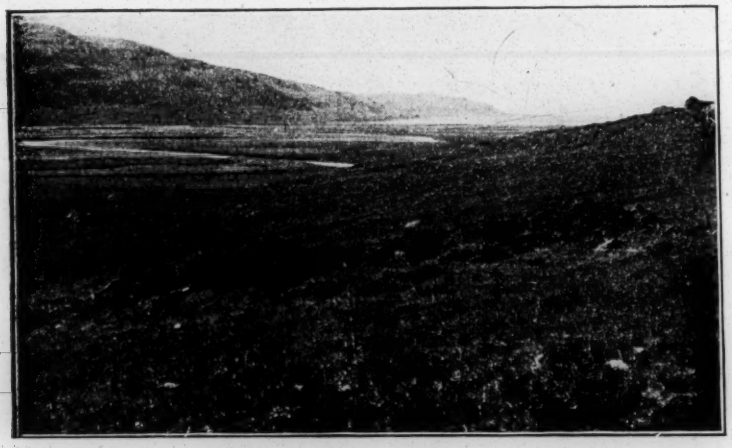
The Icelandic Antiquarian Society has done some good work in the field. They have identified and roughly measured the ruins of many historical farms and of several hundred booths at some of the old open-air law courts called "things." One or two pagan temples have been dug out and carefully described, and many burial mounds, which also belonged to the pagan days. The ancient dwellings were situated on sloping ground, near rivers or fjords.

From the early days this has been believed to be the ruin of the house built by Erik the Red in the Hawk River valley soon after his marriage with Thorhild, and here his eldest son Leif was probably born. Erik lived in four different places in Ice-

* "Privatboligen paa Island i Saga-Tiden" af Valtyr Gudmundsson. Copenhagen, 1889. Andr. Fred. Host & Sons, Forlag.

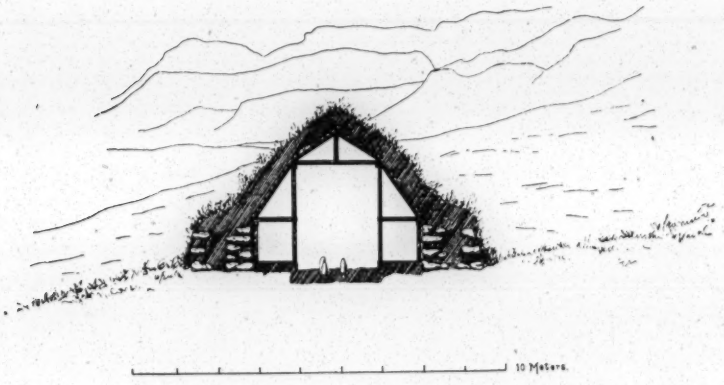
† The report of this expedition will soon be published by the Viking Club of London under the title of "Ruins of the Saga-Time."

‡ The researches of this society are published yearly at Reykjavík, Iceland, in the "Árbók hins Islenzka Fornleifafélags."



SUPPOSED BIRTHPLACE OF LEIF ERIKSON

land before he finally settled in Greenland. The supposed ruins of his houses on Öxney and Sudrey can still be seen also,* but I do not know that any ruins have been identified at Drangar. The ruins of these dwellings, when undisturbed, are low, grass-grown ridges and hollows often difficult to detect, except when stones protrude through the turf. A dwelling usually consisted



VERTICAL SECTION OF AN APARTMENT

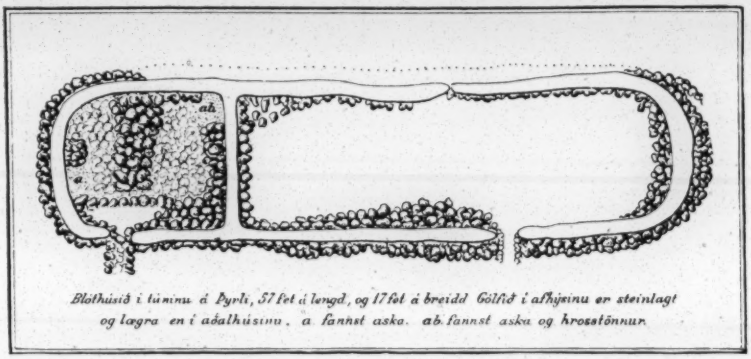
of three apartments: a hall or principal room, in which there was always a fireplace; a sitting room for the women, and a store-room or pantry.† These apartments were like small houses,

* "Finding of Wineland the Good," by A. M. Reeves, p. 165.

† "Fortidsminder og Nutidshjem paa Island" of Daniel Brunn. Copenhagen, Ernst Bojesen, p. 161.

each with a separate roof, but attached to each other, with passages through the thick walls. Near by were usually one or more small outhouses. These dwellings were built on the surface of the ground, which was probably levelled when necessary. The floor was of firmly beaten earth.

The walls were one and a half meters thick and from one to one and a half meters high. The inner side was built of unhewn stones and the interstices were filled with earth. The outer side was of alternate layers of turf and stones, and the space between the two sides was filled in with earth kneaded hard. When these walls fall, the stones necessarily slip down on either side, and the bottom row with the space between remains almost intact, unless


ab
a
Blóthúsið í túninu á Þyrli, 57 fet á lengd, og 17 fet á breidd. Gólfið í afhýsinu er steinlagt og lægra en í aðalhúsinu. a. fannst aska. ab fannst aska og hrosstönnur.

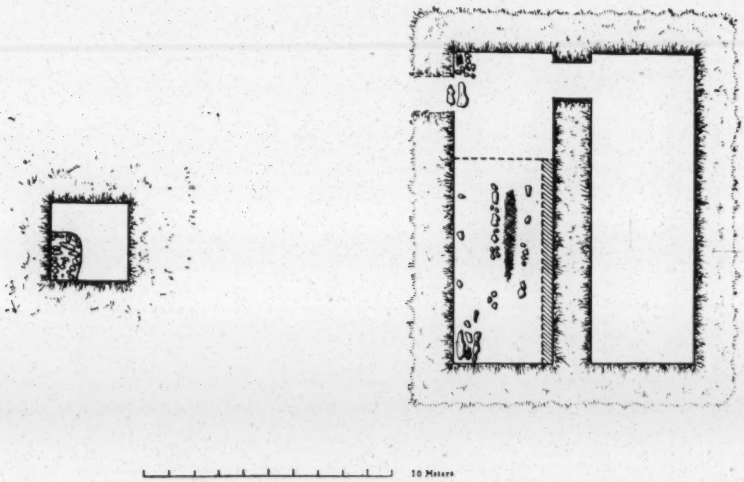
RUIN OF PAGAN TEMPLE AT THYRLI

Árbók Hins Íslenzka Fornleifafelags, 1880–1881

unnaturally disturbed. Often, however, the walls were built entirely of layers of turf or with only disconnected rows of stones at the base.

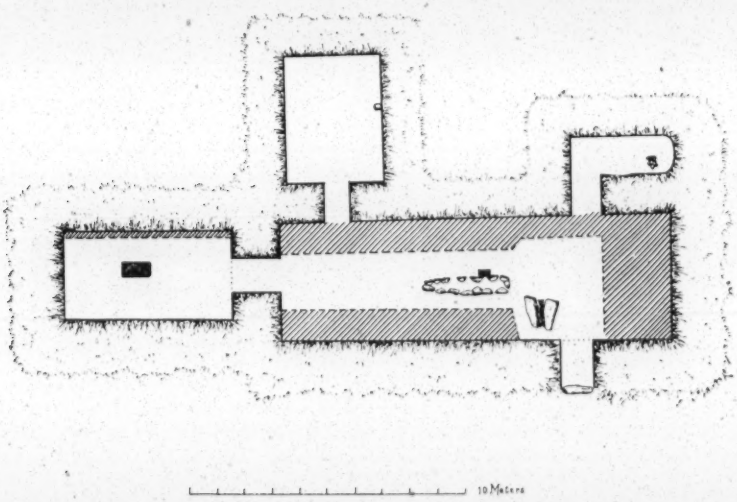
The drawing of the pagan temple at Thyrli shows the manner of laying the inner and outer sides of a wall with the earth between the two. A large stone, of course, extends farther back into this earth between than a small one does.

The inside measurement of a hall varied from 3 to 7 meters in width and from 10 to 17 meters in length. The plan is of the ruin of Erik the Red's house, shown above from a photograph. A long narrow fire-place usually extended through the middle of the room. This was either paved or surrounded with stones standing on edge, and was about 3 meters long and from 60 to 80 centimeters broad. Besides the long fire which served to warm and light the hall, there was a small cooking fire made in the same way, about 1 meter square and raised a few centimeters



PLAN OF THE HOUSE OF ERIK THE RED IN HAUKADALE

above the level of the floor. Other non-essential forms of fireplace I need not describe here. A separate apartment was often formed by erecting a thin partition across a room, as is shown in this plan by the dotted line. Pavements, but more often thresholds made of one or more long stone slabs, were sometimes in the doorways and also in the passages through the thick walls between the apartments. The outhouse shown at the



RUIN OF SÁMSSTADIR IN HIGÓRSÁRDALR

left was about 13 meters from the door of the house, on the steep mountain side. It was 4 meters square, built of turf only, and partially underground. There was a large square platform of stones in one corner which had served for a fire-place.

Narrow platforms of earth faced along the outer edge with upright stones, on which the inhabitants both sat and slept, extended along one or both sides of the hall. In the large halls these platforms were about 23 centimeters high and 1¼ meters broad. Sometimes there was also a broader platform at one end of the hall. Sámsstadir is one of the farmsteads in the Thor's River valley which was buried during an eruption of Mount Hecla in the fourteenth century. This valley is called the Pompeii of Iceland. The farm was probably abandoned about 1300. It shows the first change in the evolution toward thicker walls.

With the exception of some spinning-stones, which were found in the sitting-room of a house not shown here, no relics were found during these researches. It is also an interesting fact that no runic inscription belonging to the Saga-time or for two centuries later has yet been found in Iceland.

The evolution which has taken place in house-building since the Saga-time has been in the steady increase in the thickness of the walls until their breadth is nearly doubled, a slight increase in height, not admitting a second story under the roof, and the addition of many apartments, so that from a distance the many roofs of a farmstead look almost like a little village.

GREENLAND

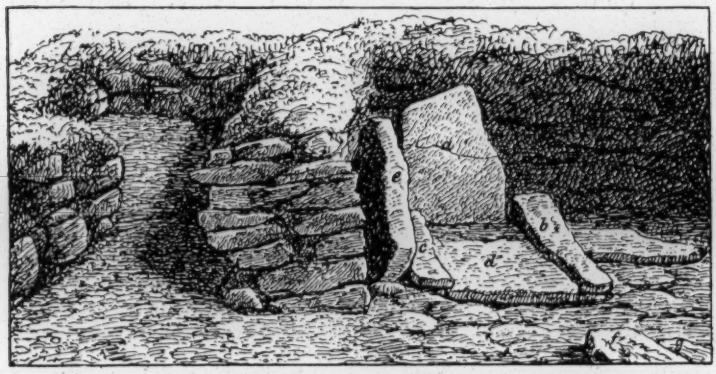
Greenland was discovered and colonized by Erik Thorvaldsson toward the end of the tenth century, and from that time two Norse colonies, called respectively the eastern and the western settlements, prospered for about three hundred years. The ruins of these two settlements have been studied with more or less care by the Danish government. In the eastern settlement a hundred and fifty farms, with all their outbuildings, have been surveyed and measured. A few dwelling-houses have been thoroughly dug out and examined.*

* Beskrivelse af Ruiner i Julianehaabs Distrikt i Aaret 1880, af G. F. Holm. Meddelelser om Grönland, udgivne af Commissionen for Ledelsen af de geologiske og geographiske Undersögelser i Grönland. Copenhagen, 1883, vol. vi.

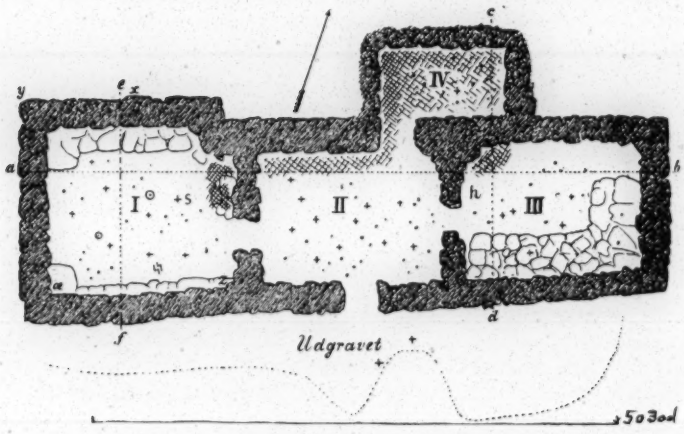
Undersogelse af Grönlands Vestkyst fra 64°. til 67° N. B. af J. A. D. Jensen, 1884 og 1885. Meddelelser om Grönland. Copenhagen, 1889, vol. viii.

Arkæologiske Undersögelser i Julianehaabs Distrikt af Daniel Brunn, 1895. Meddelelser om Grönland. Copenhagen, 1896, vol. xvi.

As in Iceland, these farmsteads were situated on the shores of rivers and fjords. Although in the main they resemble those of Iceland, one is impressed at once with certain striking differences. Even the undisturbed ruins suggest narrower, straighter, and stronger walls.



WALLS OF A NORSE RUIN IN GREENLAND
Meddelelser om Grönland, vol. xvi. Daniel Brunn

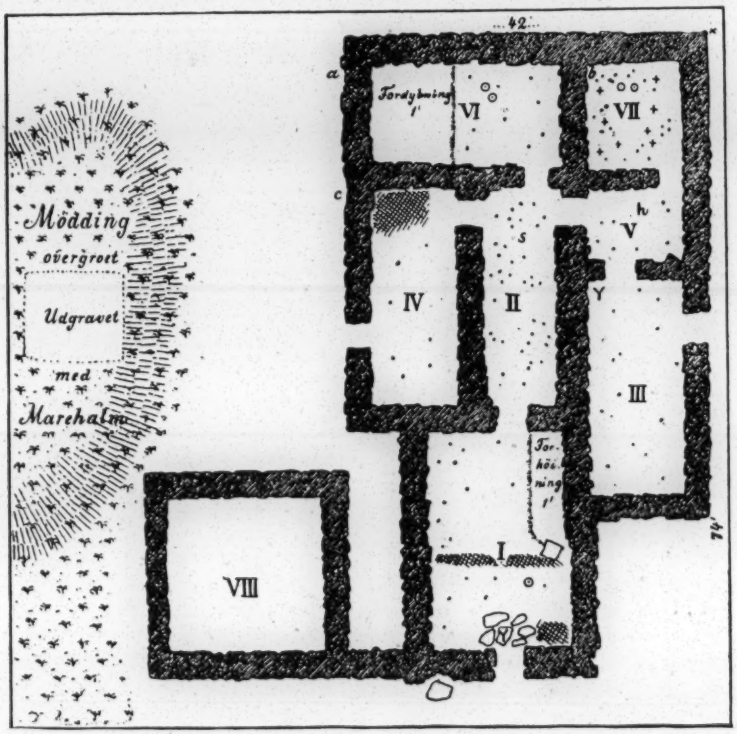


PLAN OF A NORSE RUIN IN GREENLAND
Meddelelser om Grönland, vol. xvi. Daniel Brunn

The dwellings were usually long and narrow, consisting of from three to eight rooms, and were surrounded by numerous outhouses and stables for cattle, sheep, and goats. Close to the houses are found enormous midden heaps, often larger than the

ruins of the houses themselves. The walls were narrower than the Icelandic walls, and, although they were built of layers of turf and stone or sometimes of turf on a foundation of stone, the middle space, filled in with earth, had almost disappeared, as may be seen in the sketch. The long platforms of stone along the walls, the pavements, thresholds, and scattered fireplaces recall similar constructions in Iceland.

In 1261 Greenland became subject to the Crown of Norway, and to this influence the Danes attribute certain differences be-



SUPPOSED SITE OF THE HOUSE OF ERIK THE RED IN GREENLAND
Meddelelser om Grönland, vol. xvi. Daniel Brunn

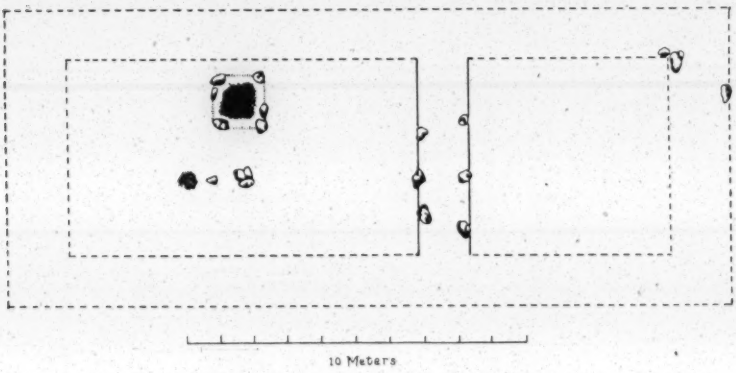
tween the customs of the Norsemen in Iceland and in Greenland, which I need not describe here.* Perhaps the difference in architecture is due to the same cause. The ruin of the house found on the supposed site of Brattahlid, the abode of Erik the Red, looks as if it might have been remodeled several times since that fearless Norseman first settled in the land.

* Meddelelser om Grönland, vol. xvi, p. 490.

Numerous relics have been found in these ruins—iron nails and knives, pieces of stone vessels, spinning stones, bone combs, and stone pendants bored with holes and incised with rune-like but illegible characters. These, like all the ruins in Greenland which have been thoroughly dug out, are attributed by the Danes to a period later than the Saga time.

VINELAND

The ruins, found where one had every reason to hope to find traces of the houses built in Vineland by Leif Erikson and his followers, did not differ in their essential features from those of Iceland in the Saga-time. The situations were similar. The walls were laid in the same way and were of the same thickness, and the fireplaces were constructed as they were in the habit of constructing them at home.

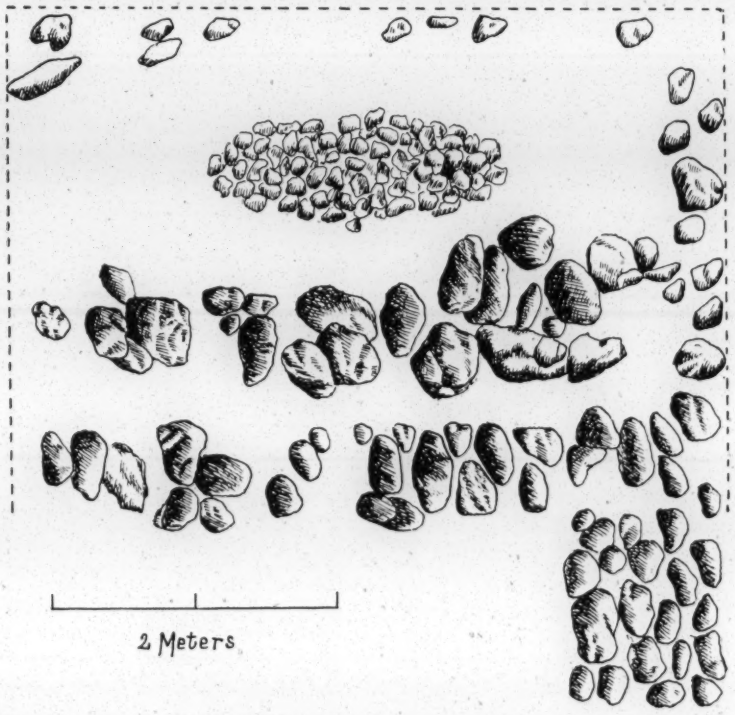


SUPPOSED NORSE RUIN IN MASSACHUSETTS

The walls of this house can be little more than suggested. They were probably built almost entirely of turf, and they looked as if they might have been intentionally destroyed. I show it for its fireplace. Three or four fireplaces were on the site, one of them being the familiar Indian clam-bake, with its neatly paved, saucer-shaped hearth piled with ashes and unopened clam shells, for this temptingly prepared feast had never been eaten. One of these fireplaces, however, was very different from the others, and of the Icelandic type, with its surrounding upright stones at the four corners and a mass of charcoal and stones inside. This house is one of those on the place pointed out in Cambridge by my father, Eben Norton Horsford, as the site of

the group of houses built by the party of Thorfinn Karlsefni in Vineland.

The second house I show for the construction of the walls and the little pavement, presumably at the door, which resembles that in the temple at Thyrli shown before. The outer side of the wall contained only one layer of stones, the inner, according to custom, containing more and larger stones, some of which had fallen in. The oblong platform of small stones occupied the place of



SUPPOSED NORSE RUIN IN MASSACHUSETTS

and resembled a fireplace, but showed no trace of such use, unless in the dark sticky earth between and under the stones, which I have since been told may have been ashes absorbed in the soil. This house, with the other ruins near it, are about ten or more miles from the settlement at Cambridge, and so far from the river that it must be attributed to later visitors from the North than those told about in the Vineland Sagas.

No relics have been found at either of these sites which I attribute to the Northmen. I have, however, one stone implement,

which was found imbedded in the yellow sand and seemed to have been lost before the advent of the Northmen, and presumably belonged to the savages they found here.

Probably the reader will contrast these different dwellings of the Northmen with those of the native tribes of North America, from the magnificent ruins of Copan to the long, narrow houses of the Iroquois, and will detect the similarities and differences between these and the habitations of the Greenland Eskimos.

The Spanish, Dutch, French, and English explorers visited and might have built houses on these shores, but in Europe no houses of this type are found outside of Iceland, except in the Faroes, and, although ruins of Norse dwellings are probably awaiting detection in England, Scotland, Orkney, and Shetland, they have not yet been brought to the notice of archeologists.*

The earliest examples of architecture on our shores, as well as the present knowledge of the evolution of European architecture, as far as I have been able to find out, show that the walls of the inferior houses in post-Columbian times were unlike those of Iceland. Our oldest French house is the Sillery manor house near Quebec, built by the Jesuits in 1637. The walls of this house are built of stone, and are three feet thick, laid in mortar which is now nearly as hard as the stone itself. I have been unable to find anything more primitive of French workmanship here. I have found nothing in English work which is not familiar to you all, although I have followed up several mistaken reports. The Dutch buildings show an equally advanced though different type of development, and also the Spanish.

I am glad to have an opportunity to express publicly my sincere thanks and deep indebtedness to the American archeologists, both here and in Canada, who have come most kindly to my assistance and taught me in the field the knowledge they had acquired by their own experience, without which I could not have learned how to gather many facts, a few of which I have here presented.

Mr Gerard Fowke: Seven weeks of field work in and near Cambridge. Two weeks of field work in Ohio, Pennsylvania, West Virginia, and Maryland, 1894. Five weeks in Cambridge, 1896.

Dr Franz Boas: Two days in and near Cambridge, 1894.

Mr David Boyle, *Curator of the Canadian Institute at Toronto:* One week in and near Cambridge. One week in Ontario, Canada, 1894. One week in Cambridge, 1896.

*Since writing this I have been notified that ancient Norse ruins have been found in the Hebrides.

Mr F. W. Norris, *Hon. Editor of the Viking Club, London:* One week in Cornwall, 1895. Three weeks in Scotland, Orkney, and Shetland, 1896. Two weeks in England, 1897.

Dr phil. Valtyr Gudmundsson, *Professor of Old Norse History and Literature at the University of Copenhagen:* Direction of explorations in Iceland for four months, 1895. Five weeks in and near Cambridge, 1896.

Mr Thorsteinn Erlingsson, *Iceland:* Four months in Iceland, 1895.

Rev. Henry Otis Thayer, *Maine Historical Society:* Two weeks among old English ruins in Maine, 1896.

Sir James Lemoine, *Past President of the Royal Society of Canada:* Direction of researches near Quebec, 1896.

Mr C. C. Willoughby, *Peabody Museum, Cambridge:* Two days on Cape Cod, 1897.

Mr W J McGee: Advice, criticism, and encouragement, both in Washington and Cambridge for over four years.

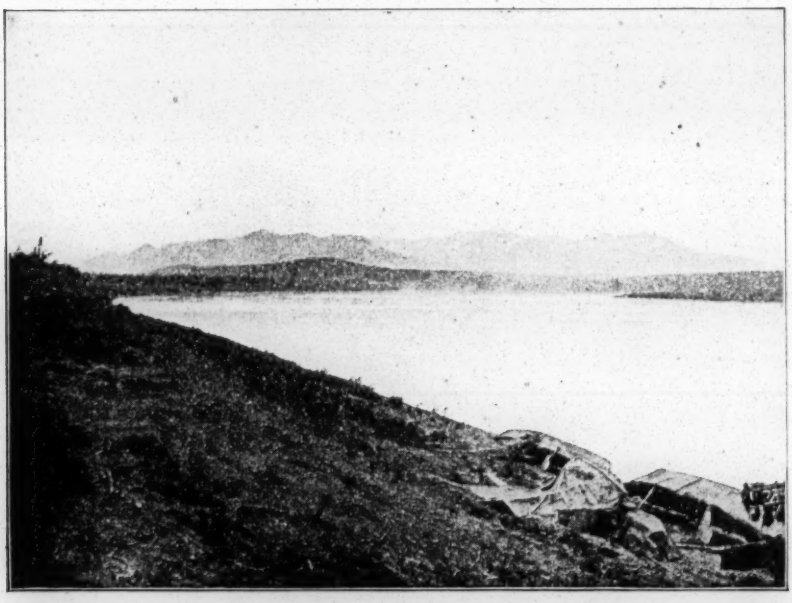
COMPLETION OF THE LA BOCA DOCK

In a recent report to the Department of State, Consular Clerk Murphy of Colon announces the completion of the La Boca dock, the Pacific terminus of the Panama canal. The real importance of the work at La Boca, says Mr Murphy, remains to be demonstrated. The tide fluctuation at Panama amounts to over 25 feet, and at the lowest ebb the bottom of the sea is exposed for a mile or more from the shore. As to whether or not vessels will venture to use the La Boca dock, time alone will prove. Mr Murphy says he has heard the opinion expressed that the dock will prove to be a complete success. On the other hand, he has heard it even more confidently stated that this is only another example of the waste which has characterized the management of this apparently simple undertaking. To one traveling across the isthmus, he says, it appears that there can be no obstacle to the completion of the canal which money, honestly used, engineering skill, and common sense cannot easily overcome. The land is mostly level, the highest point being little over 300 feet above the sea. The distance is only about 45 miles. The freshets of the river Chagres seem to be the only difficulty, and it appears that provision for the storage or escape of such water can be made. The work, if it were in American hands and under American control, could, Mr Murphy believes, be completed in a few years at moderate cost. About one-half of the work—14 miles at the north end and 6 miles at the south—has been completed or partially completed, though the freshets of the Chagres river have caused great damage during years of neglect.

TWO HUNDRED MILES UP THE KUSKOKWIM

By Charles Hallock

Many mighty rivers besides the Yukon flow out of Alaska into Bering sea, of which the largest and most notable is the Kuskokwim. It is 800 miles long. From its source in the geographical center of the province, it flows with many a majestic sweep and sinuous curve out from granite walls, through rounded foothills and level plains, into the bosom of the sea some two degrees north of the Aleutian peninsula, and with the great bay of the same name, into which it empties, constitutes the phenomenal counterpart on the Pacific of the bay of Fundy and the river Peticodiac on the Atlantic, though the Kuskokwim is beyond comparison the larger river of the two. It is so wide at its mouth that its shores are invisible from mid-channel, and it is navigable for barges for a distance of 500 miles up. The tide rises *fifty feet*, and when it runs out it exposes a vast area of oozy mud flats

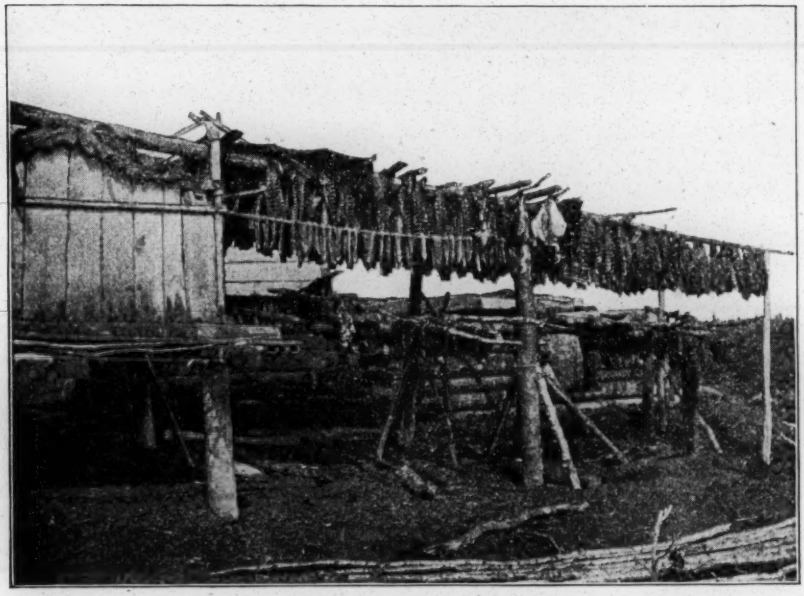


KUSKOKWIM RIVER FROM KOLMAKOVSKY

(sixty miles wide at the entrance of the river), which are seamed with countless shallow, dirty rivulets flowing seaward. Very different is its physical aspect when it is bank-full at flood. "It shimmers then like an inland ocean studded with myriads of mossy islands." The head of the tide is 100 miles upstream, at a trading post called Mumtrekhlagamute. Boats ascending the river must wait for the tide, whose flow is irresistible even by steam-power, for it rises vertically over eight feet an hour, filling up the vast chasm which forms its bed in the brief space of six hours, though there is an entire absence of anything like a tidal "bore" rolling in and overwhelming everything in its impetuous career. This phenomenal procedure is an old fable which used to be current regarding the bay of Fundy, until people learned differently, and graphic recitals were told of pigs which had been foraging on the flats, scampering before the advancing wave and being presently overtaken and engulfed.

On the Kuskokwim there are no less than sixteen trading posts and villages within the first 400 miles of its mouth. Messrs Hartmann and Weinland, Moravian missionaries from Bethlehem, Pennsylvania, who are men of marked ability, located a school and mission at Kolmakovsky, 200 miles up, as long ago as 1885; and the description of the river which here follows, with the accompanying illustrations, is from observations made by them on their initial trip. They afford a very realistic picture of summer life in the interior of Alaska and will serve to counteract the popular impression that the country is wholly frigid and barren.

When these gentlemen first arrived at the mouth of the river, in June, the salmon fishing was at its height, varying little, if any, from the running season on the St Lawrence tributaries. The eastern bank of the estuary was swarming with native fishermen (Eskimos), whose huts were strung along the top of a narrow dike at high-water mark in close continuity for miles, crowding each other so closely that there was hardly room for more. This dike was fringed with alders, willow, birch, and poplar saplings interspersed, flanked by a vigorous growth of coarse sedges and bulrushes. Back of the dike (or levee, as it would be called in the southern states) the country is a flat waste, covered with a spongy bed of moss or "tundra" from six inches to a foot deep and destitute even of shrubs. Great deposits of driftwood from above line the shore and afford fuel for the resident inhabitants, who number several thousands, but whose ranks are



FRAMES FOR DRYING FISH

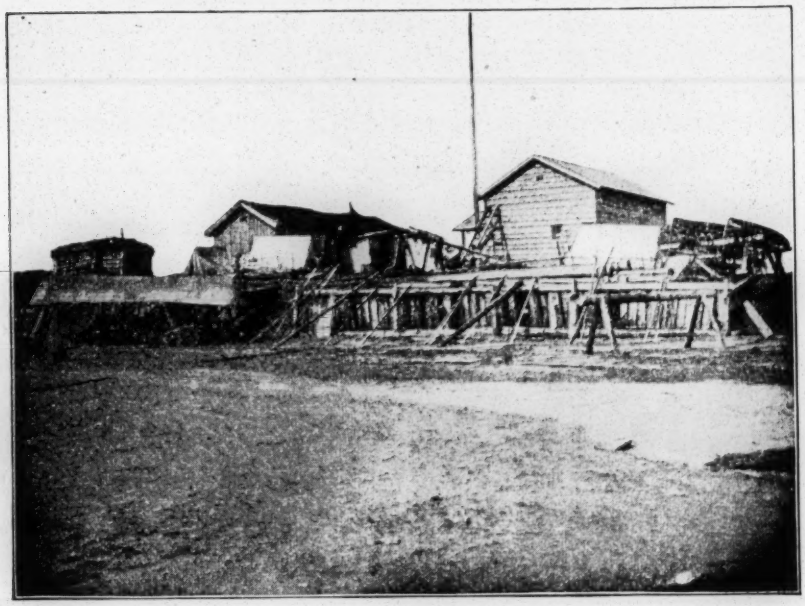
swelled in the fishing season by accessions from the Yukon to a total of perhaps seven or eight thousand. There is a portage of sixty miles from the Yukon to the Kuskokwim, which has been traveled for a century by employés of the Russian Fur Company and others since. The salmon are taken chiefly in dip-nets along the banks, and our travelers measured a specimen which weighed 41 pounds and measured three feet in girth and nearly four feet in length.

Though the Yukon is the great arterial drainage conduit for the summer meltings from the snow-capped mountain ranges which traverse the interior and are consequently filled with glacial mud, big salmon are found in it, and in some of its clear-water tributaries there is an abundance of large grayling and so-called salmon trout.

Leaving the steamer (in which they had taken passage from San Francisco) at the mouth of the river landing stores, the missionaries proceeded up the stream in company with four freighting barges destined for upper posts. Their own private conveyances were native bidarkas, or sealskin canoes decked over, each with three manholes, the passenger occupying the central hole and the paddlers the end ones. A three hours' sail brought them

to one of the storehouses above mentioned, located near the outlet of a small, deep river, it being 11 o'clock at night and still daylight. The weather was clear, but head winds detained them for the next five days. Starting on June 18, at 2 a. m., just before sunrise, they made an eight-mile pull to a village of about ten barabarahs or native houses, named Kuskokwagamute (it is well to remember these names), and, lying by until 1 o'clock, attempted to snooze, but were distressed by ravenous mosquitoes. Then a two-hours' paddle found them, at 3 o'clock, at the village of Apokachamute, numbering about 150 inhabitants, located on a small tributary of the Kuskokwim, where large numbers of beautiful salmon were lying on the bank waiting to be dressed. All the people were dressed in sealskin coats and wore beads and ivory ornaments. Lying by twelve hours, starting again at 3 o'clock in the morning—always waiting for the tide to serve—they arrived at Togiarhazorimute at 8, and after breakfast made a 60-mile run to Lomavigamute (*mute* means village). Traveling was delightful. A fine breeze kept the mosquitoes off. Point after point was reached and left behind. The skin boats seemed to glide through the water. "As we went on, the river grew narrower, so that the opposite bank became distinctly visible. The

BIDARKAS (SKIN CANOES) ON THE LOWER KUSKOKWIM

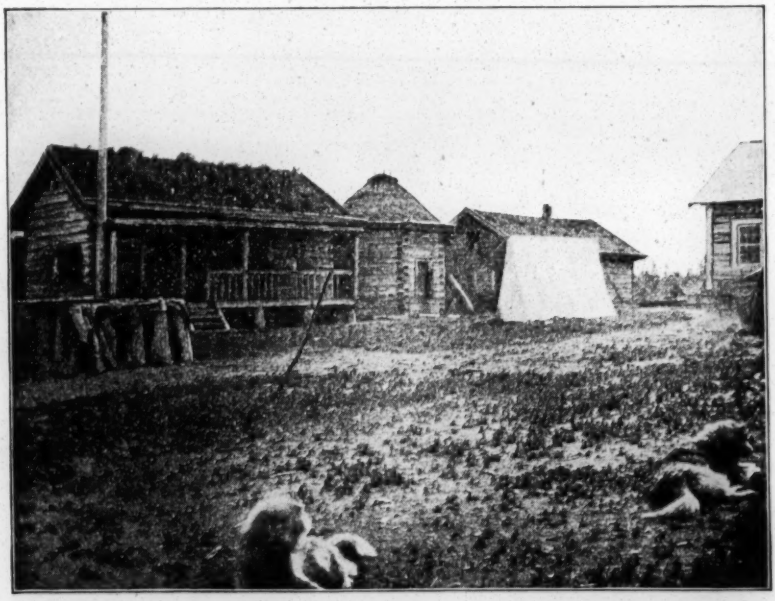


MUMTREKHLAGAMUTE

river, which hitherto had been an unbroken stream, was now divided by numerous islands into many channels. The shores were lined with a higher growth of underwood, and thickets of small birch trees alternated with grassy or mossy banks. The tide was also sluggish."

The next day, sailing still among enchanting wooded islands, they came to Napahaiagamute, where a lot of Eskimos were in their kayaks or sealskin boats with a single hole—fishing for salmon with gill nets. Soon they passed Napahaiagamute and, rounding an island, came in view of the important trading station of Mumtrekhlagamute, situated on a high bank, with a background of pine trees and a hill range in the distance. The tide here rises about 4 feet. The station comprises two large, well-built log-houses and several smaller ones, and a Russian bath-house or kashima, besides the usual annex of native barabarahs. Here the boatmen struck for higher wages, as they always do, but were finally conciliated by the factor of the trading post. The dogs here were numerous, and howled so as to disturb the missionary when he was reading the 116th Psalm by daylight at 1 o'clock a. m. The cause proved to be a wrestling match between two rivals for the permanent possession of a woman. The

following day they proceeded up a winding channel whose banks were clad with pine trees forty feet high, and finally reached Kikkhlagamute, where they counted fifty birch-bark canoes, which here begin to replace skin ones. The village contained 216 people and was situated in a low, marshy ground, with an abundance of mosquitoes. On the 27th of June they stopped at a small Eskimo fishing station, where they met a white mining prospector coming down. The villages of Akiagamute, Iulukiak, and Kivigalogamute were afterward successively passed, and the following day found them at the fishing station of an enterprising half-breed, when rain began falling, the first of any consequence since they left Unalaska on the 16th of May. Still proceeding up river, more villages—Ugavik, Kalkhagamute, Ookhogamute—were passed, all under the influence and civilization of the Greek church, and at last, after a journey of 9 days, the great focal trade center of this district, Kolmakovsky, was reached. Ranges of snow-covered mountains were visible the day previous, with foothills clad with pine, up whose somber glens favorable glimpses were had at times. Kolmakovsky consists of 7 log buildings, built in the form of a square, including a church and a hexagonal block-house built 50 years ago. It stands on

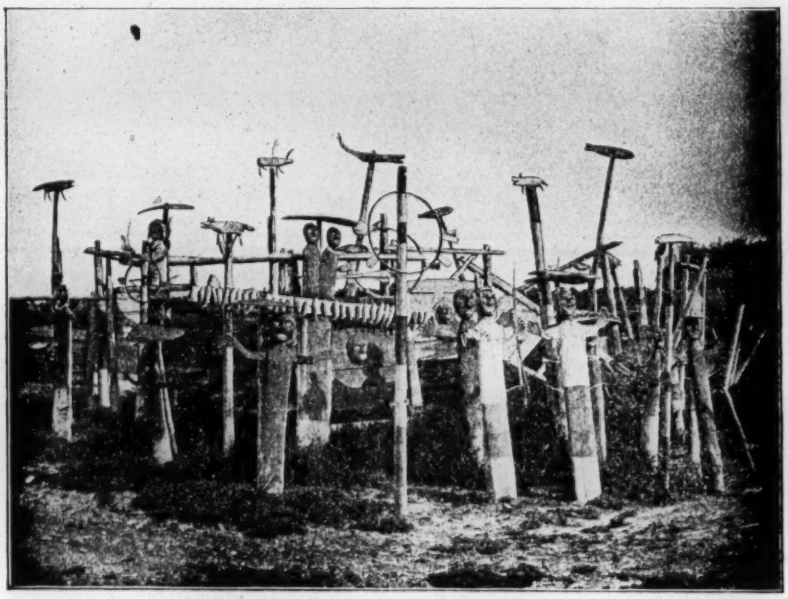


KOLMAKOVSKY

a bluff. The country seems much more populous than Alaska had been credited with being. All the white traders whom the missionaries met had adopted native women as partners, who were very decorous in manner and behavior. Their children are of prepossessing appearance, dressed in European fashion, and trained in the ways of their white fathers. There are some 50 children at Napaimute, a village 10 miles higher up the stream. These people know nothing about intoxicating liquors.

Kolmakovsky is 200 miles above the mouth of the Kuskokwim. There is another trading post, called Venizali, twenty days' journey still farther up. The missionaries retraced their voyage from this point, reaching the mouth of the Kuskokwim on July 17, in nine days' time, while the journey upstream occupied twenty-one. The weather for the previous fortnight had been fickle—sometimes bright and often rainy, warm and cold by turns, and frequently too hot for comfort. Thence they cruised along the seacoast, following its indentations to Good News bay, a large and beautiful basin surrounded by lofty mountains, and, passing safely through its narrow entrance on the surf of an incoming tide, came to anchor at the head of the bay in front of a village of 150 people of mixed complexion, and some of them almost white. By taking a canoe route from there across the neck of a mountainous headland or cape, it was possible to reach their place of destination at Togiak bay, and thus avoid a perilous coastwise journey outside, and so poling up a winding mountain stream, beautifully clear and very rapid, which finally cut a deep crooked rut through a mossy swamp, with high grass lining the banks, they came to a portage, and, crossing the divide, entered a chain of lakes which formed the headwaters of the stream which they had to descend. The lakes, of which there are four, are small, the largest scarcely a mile in length, with water beautifully clear and sweet, and full of "red salmon," some of which their native guides speared. This fish is probably *Salvelinus malma*, or Dolly Varden. One characteristic of these fish was "a big swelling on the back close to the neck." (Can these be the same as the redfish of Idaho described by Captain Bendire?) Their flavor was not highly esteemed. The outlet of this chain of lakes which the canoe followed was at first so narrow and crooked as to be scarcely passable, but it soon developed into "a winding mountain torrent, alive with trout, some of which we saw shooting through the water with incredible velocity." The paddlers had little to do except to let her run

and keep her off the banks at the bends. The scenery was very beautiful, the view bounded on either side by well shaped mountains, green with sphagnum, rising from the plain below, with snow still resting on them in patches. The region was "one vast solitude, over which bears and birds hold undivided sway." On July 26 the voyagers took dinner at the deserted village of Aziavigamute, and then made their way in a short time to Togiak bay, having occupied three days in crossing the divide. "Brother Weinland shot some ducks and four geese, and the natives speared a large salmon."



ESKIMO MONUMENTS

Subsequently the missionaries made a trip up the Togiak river, which occupied two days, and after visiting several villages with polysyllabic names they returned to the coast, where they found a hamper from their friends of the Alaska Commercial Company (bless them!) which "contained thirty good cigars (it seems the brethren smoke), four large cakes of tobacco, two tins of boiled oysters, two of corned beef, one of fresh boiled beef, three tins of sardines, one of peaches, one of corn, and one of peas."

So the record runs.

THE MT ST ELIAS EXPEDITION OF PRINCE LUIGI AMADEO OF SAVOY, 1897

A lecture of Dr Filippo de Filippi, who accompanied Prince Luigi of Savoy on his expedition to Mt St Elias, was delivered before the Turin Alpine Club and has been published in the *Rivista Mensile del Club Alpino Italiano*, the first authentic account given of that remarkably successful ascent of one of the greatest snow peaks of the world. A translation of this article appears in the latest Sierra Club Bulletin, January, 1898, by Dr Paolo de Vecchi, of San Francisco, member of the Sierra Club and the Turin Alpine Club, who assisted Prince Luigi by making the advance preparations on the Pacific coast.

Dr Filippo de Filippi tells how Prince Luigi determined upon the expedition in February, 1897, and at once began correspondence with those in the United States who could best inform and advise him. He associated with him Lieutenant Cagui, Sr Gonella, Sr Vittorio Sella, the Alpine photographer, and Dr Filippo. Four guides or huntsmen from the royal Italian estates and the special guide of Sr Sella accompanied them, leaving Turin May 17 and reaching New York from Liverpool May 28. They proceeded to San Francisco, where part of the equipment was procured, and sailed from Seattle on the regular mail steamer for Alaska June 13, Major E. S. Ingraham, of Seattle, with ten American packers, their equipment and provisions, having sailed a few days before on the schooner *Aggie*. The expedition left Sitka June 20, the mail steamer towing the *Aggie*, for Yakutat bay, where a landing was made on the coast of the Malaspina glacier June 23.

Prince Luigi was thoroughly informed of all the work of the expeditions of Schwatka and Topham and of the two expeditions sent to Mt St Elias by the National Geographic Society, Prof. I. C. Russell commanding, and before leaving Italy had planned every detail and mapped out his route. Professor Russell, Professor George Davidson, the senior scientist of the Pacific coast, Professor Fay, of the Appalachian Club, Boston, and Major Ingraham, of Seattle, who has climbed Mt Rainier again and again, gave advice and assistance without stint. It was the most thoroughly planned and well managed expedition that we have

known of on American peaks, and was carried out like a military maneuver. Perfect discipline and harmony prevailed, the ten Italians leading the way, while Major Ingraham and his ten packers conducted a transport service that never failed in promptly passing on, by the chain of camps extending to the foot of the Newton glacier, the ample store of provisions landed at the seashore. There was not the slightest delay nor hitch in any of the arrangements, and from the time Prince Luigi left Turin until he returned to London everything moved like military maneuvers at an annual review. It was indeed but a promenade to the top of Mt St Elias and back again—a promenade over the ice and snow that had daunted and defeated four expeditions before that year and a fifth expedition but a fortnight before Prince Luigi landed on the forest-covered edge of the Malaspina glacier.

Starting from the seacoast on the morning of June 24 and always preceding the party to choose the way and determine the places for halts and camps, Prince Luigi led his men across Malaspina's forest, and on the sixth day reached the edge of clear ice, where the four extra Indian packers were sent back to Yakutat and the sleds made ready for use. They were then 492 feet above the sea, the real climb began, and for all the rest of the way their route lay over snow and ice—Mt St Elias presenting the longest snow climb anywhere in the world.

Beginning their alpine work on the 1st of July, allowing one day's rest on the Fourth that the Americans might celebrate Independence Day, Prince Luigi piloted them across the Malaspina and Seward glaciers to the point near Pinnacle pass where he found the cairn and tent fragments left by Prof. Russell in 1890. At that point Major Ingraham and the American packers were left behind to carry on independently the work of passing provisions up from the coast and victualling the route as far as the upper Newton glacier, where the Italian guides then took charge of the packs. The Prince proceeded across the Seward and on up the Agassiz and Newton glaciers toward that same ridge on the north side of St Elias from which Prof. Russell essayed the summit in 1891. They encountered rain, fog, mist, and snow for all the early part of the climb, dragging the sleds over slush and soft snow in which they often sank to their hips. Of the thirteen days spent in toilsomely ascending the Newton glacier only three were tolerably clear, and Dr Filippo says: "During these the panorama was really enchanting, with its

different colors changing at every instant, and with a characteristic indigo blue very different from the coloring of the Italian alps. These glaciers differ from those of the Alps in that the stormy weather in Alaska is not dangerous and the thunder is not heard mingled with the noises of the avalanches."

On the morning of July 30 Prince Luigi left the camp at the head of the Newton glacier, 8,958 feet above the sea, and camped that night on a ridge 12,248 feet above the sea. "The atmosphere is so clear that the far-away sea and all the peaks around * * * can be seen. From St Elias and from the rocks of Newton continual avalanches of snow and ice and stone fall with a tremendous noise. The sun-setting is beautiful. The sky is steel blue, the rest of the horizon orange-red, and Augusta (Mt) looks like a volcano in eruption," Dr Filippo observes, from which it may be inferred what photographs Prof. Sella was able to make with his two large cameras. Starting at midnight with perfectly clear sky and climbing to a point 16,400 feet, they halted for breakfast, and then continued the dizzying, exhausting climb, resting every ten minutes to breathe.

"One hundred and sixty feet from the top, Petigax, who is at the head, stops to give way to the Prince, telling him, 'It is for you to touch the top first, as you deserve it by your perseverance.' His Highness steps to the top of St Elias, and all the others run, anxious and exhausted, to join him in the hurrah. The victory is complete, and it is all Italian. All ten have accomplished the purpose for which they left their own country. * * * It was 11.45 of the 31st of July, 'and the Italian flag was waving, hanging to a post, while the little crowd stood cheering Italy and the King.'

"The temperature is —12° centigrade. The mercurial barometer points to 385 mm. and, with the correction, shows an altitude of 18,086 feet above the sea level, closely approximate to that of 18,080 feet, calculated in 1891 by Russell with triangulation."

The descent was as perfect a military maneuver as the ascent, the party making three of the previous camps in each day; the food supplies were all in waiting at the chain of camps, and in ten days they had retraced the route it had taken them thirty days to ascend. The Prince had ordered the *Aggie* to meet them between the 10th and 11th of August. On the evening of the 10th they camped on the shore, embarked on the 11th, sailed on the 12th, reached Sitka the 17th of August, fifty-seven days

after leaving it. Sailing from New York by the *Lucania* September 4, the party broke up in London September 11, the Prince in good time to take part in some yacht races for which he had promised to reach England by the middle of September—the most modest and unassuming as the most intrepid and successful of all the explorers who have essayed Mt St Elias. E. R. S.

THE ORIGIN OF FRENCH-CANADIANS*

Acadia was peopled without any kind of organization between 1636 and 1670. No one has yet satisfactorily demonstrated where the French of that colony came from, though their dialect would indicate their place of origin to be near the mouth of the river Loire. They were distinct from the French-Canadians in some particulars, and not allied by marriage with the settlers of the St Lawrence. It is ascertained from Champlain's writings that no "habitant" tilled the soil of Canada during the first quarter of the seventeenth century.

From an examination of family and other archives, involving over thirty years' labor, the following conclusions are arrived at: Perche, Normandy, Beauce, Picardy, and Anjou contributed about 200 families from 1633 to 1663, the period of the Hundred Partners' regime. By natural growth these reached the figure of 2,200 souls in 1663. In 1662–1663 there came about 100 men from Perche and 150 from Poitou, Rochelle, and Gascony, with a small number of women. This opens a new phase in the history of our immigration by introducing Poitou and Rochelle among the people of the northern and western provinces of France, already counting two generations in the three districts of Quebec, Three Rivers, and Montreal.

After 1665 the city of Paris, or rather the small territory encircling it, contributed a good share. No part of the south or east of France had any connection with Canada at any time. Normandy, Perche, Maine, Anjou, Touraine, Poitou, Saint Onge, Angoumois, Guienne, and Gascony—on a straight line from north to south—furnished the whole of the families now composing the French-Canadian people.

From 1667 to 1672 a committee was active in Paris, Rouen, Rochelle, and Quebec to recruit men, women, and young girls for

*Abstract of paper, by B. Sulte, read before the Anthropological Section of the British Association for the Advancement of Science, at the Toronto meeting.

Canada. This committee succeeded in effecting the immigration into Canada of about 4,000 souls. Half of the girls were from country places in Normandy, and the other half were well educated persons who did not go into the rural districts, but married in Quebec, Three Rivers, and Montreal.

In 1673 the King stopped all immigration, and this was the end of French attempts to colonize Canada. The settlers, of course, remained as they were, and in 1680 the whole population amounted only to 9,700 souls. Double the number every thirty years and we have the present French population of the Provinces of Quebec and Ontario, and of the groups established now in the United States.

On the subject of uniformity of language, which is so remarkable among the French-Canadians, we may observe that it is the best language spoken from Rochelle to Paris and Tours, and from there to Rouen. Writers of the seventeenth century have expressed the opinion that French-Canadians could understand a dramatic play as well as the élite of Paris. No wonder to us, since we know that theatricals were common occurrences in Canada, and that the "Cid of Corneille" was played in Quebec in 1645; the "Tartuffe of Molière" in 1677, and so on. The taste for music and love for song are characteristics of the French-Canadian race. The facility with which they learn foreign languages is well known in America, where they speak Indian, Spanish, and English as well as their own tongue.

THE HEIGHT OF MT RAINIER

By Richard U. Goode,

United States Geological Survey

Four separate determinations of the height of Mt Rainier, Washington, have been made, and, while no single one of them independently would be considered conclusive, the close correspondence between the results warrants an acceptance of the mean as being very close to the true altitude. Two of these determinations were by cistern barometer and two by angulation.

During the summer of 1897 Professor Edgar McClure carried a cistern barometer to the summit of Rainier, at the time the Mazamas had their annual outing, and obtained one set of observations, including readings of attached and detached ther-

mometers.* The barometer had been especially prepared and was supposed to be in the very best condition. These observations were carefully computed by Professor E. H. McAllister, of the University of Oregon, in connection with synchronous barometric readings at Seattle, Portland, Fort Canby, and Walla Walla, these points occupying positions approximately north, south, west, and east of Rainier. The result was 14,528 feet above sea-level. Major E. S. Ingraham, of Seattle, had previously determined and published the altitude of Rainier, as a result of readings of mercurial barometers, as 14,524 feet.

In 1895 Mr S. S. Gannett, of the U. S. Geological Survey, determined the height by angulation, in connection with triangulation in the Cascades, to be 14,532 feet.† In 1896 Mr G. E. Hyde, also of the U. S. Geological Survey, while making a topographic map of the country to the northeast of Rainier, secured about forty angles of elevation to the highest point of the mountain from various points, the distances averaging about 25 miles, the mean of all these results being 14,519 feet.

RECAPITULATION:

	Feet.
Barometric determination, McClure and McAllister	14,528
Barometric determination, Ingraham	14,524
Angulation determination, U. S. Geological Survey, Gannett	14,532
Angulation determination, U. S. Geological Survey, Hyde	14,519
Mean	14,526

In addition to the above, the U. S. Coast and Geodetic Survey determined the height of Rainier by angulation to be 14,440, but the distances used were so great that the result was considered merely approximate.

GEOGRAPHIC WORK BY THE BUREAU OF AMERICAN ETHNOLOGY‡

The germ of the Bureau of American Ethnology was an exploration of the canyons of Colorado river, begun in 1867 by Major J. W. Powell. At first an amateur exploration, the work was gradually refined into a survey fostered and afterward sup-

*In descending the mountain Professor McClure lost his life by falling over a precipice on July 27.

†NAT. GEOG. MAG., vol. vii, p. 150, April, 1896.

‡Extract from one of the replies (signed by W J McGee, Ethnologist in Charge, Bureau of American Ethnology) to letters of inquiry for information to be incorporated in a paper on geographic research in the United States for presentation before the British Association for the Advancement of Science at the Toronto meeting.

ported by the Smithsonian Institution and the Federal Government. The bureau thus built up was known as the "U. S. Geographical and Geological Survey of the Rocky Mountain Region" until 1879, when the work was divided, a moiety being transferred to the newly instituted U. S. Geological Survey, the other moiety (including the ethnologic researches, which constituted an important part of the work of the Rocky Mountain survey) being continued in the ethnologic bureau at the cost of the Government and under the supervision of the Smithsonian Institution; so the geographic work of the Bureau may be considered to have begun with the exploration and survey of Colorado canyon and the neighboring country through the boldest and most perilous among the scientific expeditions recorded in the annals of the nation. Subsequently it was found inexpedient to make extended geographic surveys, and the work was generally carried forward by means of the surveys and maps of other instrumentalities, notably the U. S. Geological Survey. Yet from time to time special explorations and surveys have been made, the latest (and the most extended during recent years) being that of western Sonora (Mexico) and contiguous parts of Arizona, by W J McGee, with W. D. Johnson as topographer, who traversed a considerable territory of which portions were never before trodden by white men. Although the surveys have thus been limited, the researches, viewed broadly and in clear light, are largely geographic. It is a primary function of the Bureau to trace the geographic distribution of tribes and larger groups of aborigines; and this has been done throughout the territory of the United States, and, to some extent, in contiguous countries, and the resulting ethno-geographic maps are recognized as standards throughout the world. At the same time, effort has constantly been made to trace the migrations of the native tribes, as observed by the pioneers and as indicated by the surprisingly rich legends and traditions of the tribesmen, and also as recorded in the distribution of prehistoric relics; and thus it has been found feasible to prepare ethno-geographic maps of various portions of the continent representing different periods in the development of the primitive race, and a number of maps showing the migrations and less regular wanderings of the native tribes have been published. Through observations on the tribes and studies of their wanderings it has been found that primitive peoples are, in large measure, creat-

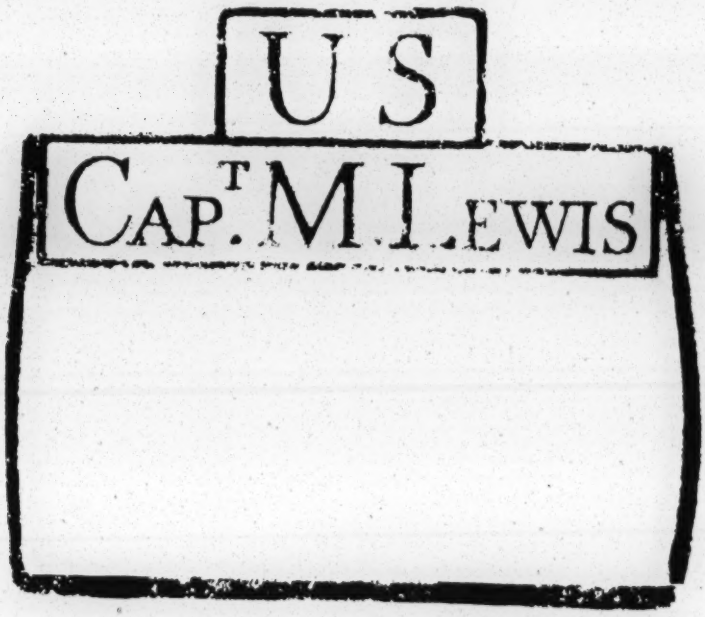
ures of environment, and thus reflect the geographic conditions by which they are surrounded; and the researches concerning the relations between man and geographic condition have been found suggestive and fruitful. The various studies have served to correct early impressions concerning the aborigines; it has been shown that the Indians were more or less definitely organized in tribes and confederacies, belonging to some sixty distinct stocks or families, each characterized by distinct languages, institutions, and beliefs, and each occupying a definite though perhaps slowly shifting habitat. Some of the groups were large, some small, the greater number being confined to a narrow belt along the Pacific coast, while a few large groups occupied the eastern two-thirds of the continent. Study of the movements of the natives constituting each group indicates that they expanded or contracted, and shifted or persisted, much as do the definitely organized nations of civilization, under the influence of both external and internal forces, the former being essentially geographic and the latter essentially human. It is only when the groups are defined and when their movements are investigated and compared that the principles of ethno-geography are brought to light. These principles are set forth in a score of the publications of the Bureau.

A RELIC OF THE LEWIS AND CLARKE EXPEDITION

The print of which the accompanying illustration is a reproduction, slightly reduced, was made from an iron believed to be an original branding-iron used by Captain Meriwether Lewis on the Lewis and Clarke Expedition of 1804–'06. It was found by Mr Winans, of The Dalles, Oregon, about three years ago, clasped in the hands of an Indian skeleton, in one of the old Indian burial places on an island in the Columbia river, near The Dalles.

Quite a number of Indian burial places are located along the Columbia, and several were described by Lewis and Clarke. It was the Indian custom to bury with deceased members of the tribe any articles especially prized by them. Lewis and Clarke passed down the Columbia in November, 1805, and wintered at Fort Clatsop, near Astoria, Oregon, at the mouth of the river. In the spring of 1806 they started eastward, homeward bound,

advancing slowly up the Columbia. Their diary makes frequent mention of the fact that they exchanged trinkets of all descriptions for food and at times wood. As they approached the mouth of Snake or Lewis river, they were delayed several days in the effort to obtain horses for their overland trip across the conti-



nental divide. They found a difficulty in this, owing to their greatly reduced supplies, and everything not of absolute necessity was used in their barterings.

The above-described relic is now deposited in the land office at The Dalles. It was seen by the writer during the summer of 1897 in a fairly well preserved but, of course, rusty condition. It is one solid, welded piece of iron, with the box under the name formed by a raised rim. A pivoted handle, which was not found, was evidently used with the brand, as a short, cylindrical projection on the back of the iron could hardly have been used for any other purpose. This brand was not used for stock, but probably for stamping boxes, leather, or notices of locations or discoveries on near-by trees. It is the intention to deposit this relic with the Oregon Historical Society.

CYRUS C. BABB.

AN INTERESTING RUMOR CONCERNING ANDREE

The recent publication in the daily newspapers of a dispatch from Stockholm to the effect that Professor Nordenskjold had informed the Swedish Academy of Science that he regarded as of sufficient importance to call for a closer investigation the intelligence received by the Swedish Foreign Office that several persons worthy of credence saw Herr Andrée's balloon in the Caribou District of British Columbia in August last led President Bell, of the National Geographic Society, to immediately ask the American Minister at Stockholm, by cable, what news of Herr Andrée the Swedish Foreign Office was really in possession of. The following day a reply was received referring President Bell to the Swedish Consul at San Francisco, who, in answer to a telegram that was forthwith sent him, replied to President Bell, by telegraph, as follows:

"Statement of a balloon passing over the Horse-Fly Hydraulic Mining Camp in Caribou, British Columbia, in latitude fifty-two degrees twenty minutes and longitude one hundred and twenty-one degrees thirty minutes.—From letters of J. B. Hobson, manager Caribou Hydraulic Mining Company, and of Mrs William Sullivan, the blacksmith's wife there, and statement of Mr John J. Newsom, San Francisco, then at the camp, about two or three o'clock in afternoon, between fourth and seventh August last, weather calm and cloudless, Mrs Sullivan, while looking over the Hydraulic bank, noticed a round, gray-looking object in the sky to the right of the sun. As she watched, it grew larger and was descending. She saw the larger mass of the balloon above and the small mass apparently suspended to the larger. It continued to descend until she plainly recognized it as a balloon and a large basket hanging thereto. It finally commenced to swing violently back and forth and move very fast toward the eastward and southward. She then called her daughter, eighteen years old, and after pointing the balloon out to her they both watched it rise rapidly until it disappeared in an easterly direction. Mr Hobson writes that Mrs Sullivan and daughter are intelligent, and he is disposed to believe their statement. Mrs Hobson had at about time stated noticed Mrs Sullivan looking into the sky at something, and that she called her daughter, who went to her side, looked in the direction indicated, and both watched some object for several minutes, turning their faces from southerly to easterly direction. Mr Newsom reports that something was thrown out from the balloon when lowest, and subsequently people thought it might have been some message, but the country is too wooded to warrant any search. When Mr Newsom returned

to San Francisco he was ill and did not immediately report the matter. Mrs Sullivan has since examined the picture of Andrée's balloon and says it represents the object seen. The president Geographical Society of the Pacific here instituted inquiries that have resulted as above."

The locality described is very near Quesnelle lake. While British Columbia is in the opposite direction to that in which Herr Andrée's balloon is believed by Arctic explorers to have been borne, it is by no means an impossibility that it was carried in that direction, and the approximate date, August 4–7, at which a balloon is alleged to have been seen in that region would be just about the expiration of the time that it is believed Herr Andrée's balloon would remain in the air. The physical features and conditions of British Columbia are such as to render it absolutely impossible to prosecute any search for traces of the alleged aerial visitant at this season of the year. Meanwhile the consensus of opinion is that Andrée, if alive, is much more likely to be in Franz Josef Land, north Siberia, north or east Greenland, or Spitzbergen, and his safe return seems to depend largely on some fortunate accident that would lead to his being picked up by a whaler.

J. H.

GEOGRAPHIC NAMES IN WEST GREENLAND

In his article in this magazine (vol. ix, pp. 1–11) Mr Robert Stein gives 46 new names to capes, bays, mountains, glaciers, etc., chiefly in honor of the "advocates of a National University at Washington." Most of these points were merely seen from a distance and most of them have already been explored and mapped, and some of them have been visited by at least two parties, each of which applied as few names as possible. The plan adopted by Mr Stein is not uncommon in "geographic exploration," though it is difficult to understand the importance of such work. Doubtless the Danes will feel fully justified in ignoring the nomenclature, which is burdensome, needless, and meaningless.

My chief object in this note is to call attention to the fact that in the promiscuous naming of things, the Wyckoff glacier,* one of the five names that I applied to this region, is ignored and replaced by the name Hearst. My belief is that names of places

* Bull. Geol. Soc. America, vol. viii, 1897, p. 257.

are valuable only when needed in description, and I have scrupulously avoided applying new names excepting where necessary for this purpose; but when once applied in this way they should not be put aside without a valid reason. But while I protest against this, I wish also to protest against geographic work which consists mainly in scattering names broadcast. Explorers often do little else than this.

RALPH S. TARR.

PROCEEDINGS OF THE NATIONAL GEOGRAPHIC SOCIETY, SESSION 1897–'98

Special Meeting, February 7, 1898.—President A. Graham Bell in the chair. Mr G. K. Gilbert lectured on the Origin of the Physical Features of the United States.

Regular Meeting, February 11, 1898.—President A. Graham Bell in the chair. Mr Richard U. Goode gave an illustrated lecture on the Bitter Root Forest Reserve. At the conclusion of the lecture Hon James Gunn, M. C., of Idaho, gave a description of that state, its topography, products, agriculture, irrigation, minerals, and mining.

Special Meeting, February 14, 1898.—President A. Graham Bell in the chair. Hon. J. Phinney Baxter lectured on New England: the Home of the Pilgrims and Puritans.

Special Meeting, February 18, 1898.—President A. Graham Bell in the chair. Mr John M. Robertson gave an illustrated lecture on the Influence of Climate and Land Formation on Early Civilization and Politics.

Special Meeting, February 21, 1898.—President A. Graham Bell in the chair. Professor Richard E. Dodge gave an illustrated lecture entitled "New York State: its Physical Geography."

Regular Meeting, February 25, 1898.—President A. Graham Bell in the chair. Mr Henry Gannett gave an illustrated lecture on Lake Chelan.

The fine portrait of Prof. Alexander Graham Bell, LL. D., the distinguished president of the National Geographic Society and inventor of the Bell telephone, which forms the frontispiece to this number, constitutes a notable addition to the series of portraits of eminent men of science which have appeared in the NATIONAL GEOGRAPHIC MAGAZINE during the past two years.

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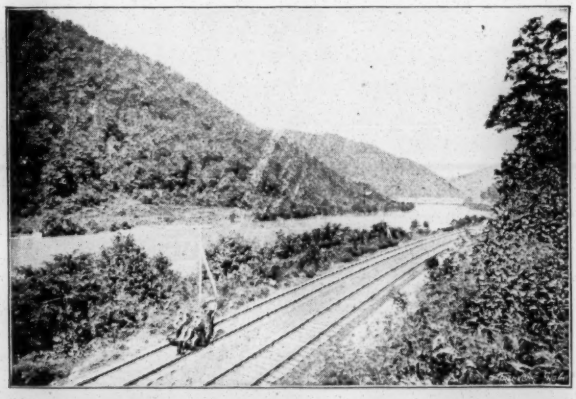

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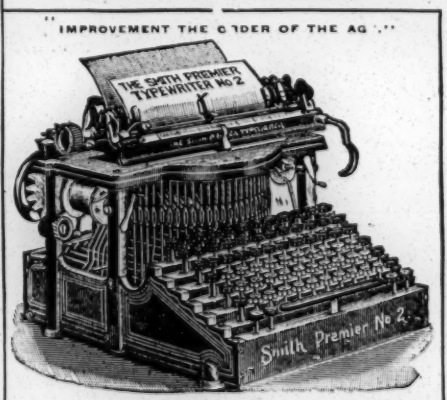

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